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NOTES ON *THOMOMYS BULBIVORUS*.

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*Thomomys bulbivorus* was accurately described by Richardson more than sixty years ago,\* but has remained, save for this author's account, entirely unknown to naturalists almost to the present day. Richardson's description of *Diplostoma* (?) *bulbivorum* was based on a "Camas-rat" from the "banks of the Columbia," a region of which the mammalian fauna has until recently been very imperfectly known; hence it is no surprising circumstance that this gopher has been so long overlooked by collectors.

In the spring of 1890 Mr. A. W. Anthony took, at Beaverton, Washington county, Oregon, three specimens of *Thomomys* that soon after came into my hands and were immediately identified with the subject of Richardson's description. Lack of proper material to determine the questions of nomenclature raised by this discovery prevented any publication at the time, and the matter was allowed to rest. Recently, however, Dr. J. A. Allen, with an abundant supply of specimens at his command, reviewed a number of vexed questions concerning the synonymy of various species of *Thomomys*, and at his request the Anthony skins were placed at his disposal, the rediscovery of this long-lost animal being soon after announced,† while the

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\* Fauna Boreali-Americana, I, 1829, 206.

† Bull. Am. Mus. Nat. Hist., v, 56, author's edition, published April 28, 1893.

*Thomomys bulbivorus* of Baird and subsequent authors was referred to the *Oryzomys* (*Saccophorus*) *bottæ* of Eyndoux and Gervais.

Although the rediscovery of this fine gopher has thus been made known, it still remains to redescribe the animal, which I propose to do as follows:

***Thomomys bulbivorus* (Richardson).**

*Diplostoma* (?) *bulbivorum* Richardson. Fauna Bor.-Am., 1, 1829, 206, pl. xviii (lettered "douglasii" by mistake).

*Thomomys bulbivorus* Allen. Bull. Am. Mus. Nat. Hist., v, April 28, 1893, 56, pl. i, fig. 14 (skull).

*Specific Characters.* Largest known species of *Thomomys*; colors very dark; white markings about mouth extensive and in striking contrast; tail almost naked; skull exceedingly large and heavy.

Adult (♀ No.  $\frac{397}{25}$ , collection of Gerrit S. Miller, Jr., Beaverton, Washington county, Oregon, May 5, 1890; A.W. Anthony, collector); dorsal surface mixed clove-brown and yellowish chestnut, the hairs everywhere slaty plumbeous at base, the three colors indescribably blended, but the clove-brown predominating on the head and mid-dorsal region though without forming a distinct dorsal stripe, this giving way on the sides to the chestnut, which in turn is replaced on the belly by slaty plumbeous; narrow ring around ear, muzzle, lips, outer edge of cheek-pouches, and ill-defined area extending thence to front legs very dark brown, almost black; linings of cheek-pouches and broad space between white, in striking contrast with surrounding color; a small white anal spot; dorsum of manus brownish, of pes white: a white tuft at proximal base of large tubercle on palm; tail very sparsely clothed on basal third with brownish hairs, which are not sufficiently numerous to conceal the skin; this in the dried specimen yellowish white, dark brown for 10 mm. at tip.

The three specimens differ but little among themselves in color, the variation, such as it is, being due to the varying amount of clove-brown in the fur of the back. This is a trifle less in the two males than in the female. In one of the males (No.  $\frac{399}{27}$ ) there is an indistinct wash of mars-brown on the belly. The dorsum of the right hind foot of No.  $\frac{398}{26}$  is covered with brown hairs. This, however, must be purely accidental.

Unfortunately the specimens were not measured in the flesh, but as they have been prepared with much care the following measurements taken from the dry skins are not without value:

No.	Sex.	Date.	Length.	Tail.	Hind foot.
397 225	♀	May 5, 1890.....	260	74	37
398 226	♂	May 12, 1890.....	280	73	41
399 227	♂	May 12, 1890.....	255	67	38

The longest hind foot among thirteen specimens of *T. bottæ* from Nicasio, Marin county, California, is 32 mm.; shortest, 28 mm.; average, 29.7 mm.

*Thomomys bulbivorus* differs from *T. bottæ* so greatly in color, as well as in size, that a detailed comparison of the two animals is scarcely necessary. In *T. bottæ* the prevailing tint throughout is wood-brown, more or less mixed with russet dorsally and blackening about the mouth, muzzle, and cheek-pouches. The latter are here, as in *T. bulbivorus*, lined with white; the area between, however, is usually dusky, sometimes more or less marked with white, but never, or at least very exceptionally, wholly white.

The skull of *Thomomys bulbivorus*, in addition to its very much greater size, differs from that of *T. bottæ* in many details of structure. The occipital portion is broader and flatter (ratio of height from inferior lip of foramen magnum to mastoid width 50 in *bulbivorus*, 54 in *bottæ*) and the fronto-palatal depth proportionally greater. The dorsal aspect shows no decided points of difference, though in *T. bulbivorus* all ridges and muscular attachments are more strongly accentuated. Ventrally, however, important differences at once present themselves. That surface of the exoccipital which appears on the ventral aspect of the skull immediately laterad of the condyle is in *T. bulbivorus* occupied by a deep groove running obliquely to the axis of the skull, while in *T. bottæ* the surface is almost flat. The basioccipital is much broader in proportion to its length in *bulbivorus* than in *bottæ*; the audital bullæ of the former are much flatter and less inflated than in the latter. The form of the pterygoids differs markedly in the two species, those of *T. bulbivorus* being much the larger and strongly concave internally with hamulars converging at the tips, while in *T. bottæ* these bones are flat, with hamulars divergent posteriorly. Both foramen magnum and external nares are broader in proportion to their height in *T. bulbivorus* than in *T. bottæ*. Except in size, the mandibles and teeth of the two species show no distinctive characters.

The following table of cranial measurements and ratios of *Thomomys bulbivorus* and *T. bottæ* will serve to illustrate some of these differences in greater detail.

Cranial Measurements and Ratios of *T. bulbivorus* and *T. botta*.

	<i>T. bulbivorus</i> .			<i>T. botta</i> .			
Number .....	225	226	227	416	1183	1184	1187
Sex .....	♀	♂	♂	♂	♂	♂	♂
Basilar length .....	53	49	51	44	40.6	40	41.8
Basilar length of Hensel .....	50	46.2	48	41.6	38.2	37.8	39
Zygomatic breadth .....	39	.....	35.5	30.6	29	28.4	27
Mastoid breadth .....	32.4	29.8	30	24	21.4	22	22.2
Interorbital constriction .....	7.2	7.8	7.4	6.8	6	5.4	6
Greatest length of nasals .....	21	18.2	20	16.8	15.8	15	15
Incisor to molar (alveoli) .....	23	21	22.2	18	16.6	16	17
Incisor to post-palatal notch .....	35.4	33.2	35.4	29	27	26	27
Height of crown from inferior lip of foramen magnum .....	16	15	15.4	13	12.2	12	12.2
Fronto-palatal depth at middle of molar series .....	23.4	21.5	22.4	17	16.4	16.2	16.6
Height of foramen magnum .....	6	6.4	6.4	6	5.8	5.8	6.2
Width of foramen magnum .....	7.8	7.8	7.4	5.2	5.4	5.2	5.2
Greatest length of basi-occipital .....	11.6	11.6	11	10.4	9.8	9.6	9.8
Greatest width of basi-occipital .....	11	11.2	10.6	8.2	8	8.2	8.6
Length of maxillary molar series on crowns .....	10	8.6	9.8	8.4	8	8	7.4
Length of maxillary molar series on alveoli .....	11	10.4	11.4	9.2	9	9	8.4
Greatest length of mandible .....	37.2	42.4	40	33.6	30.2	31	31.4
Length of mandibular molar series on crowns .....	9	9.4	9.6	8.8	8	8.4	8.2
Length of mandibular molar series on alveoli .....	10.4	11	11	10.2	9	9.2	9
Ratios to basilar length of Hensel—							
Of zygomatic breadth .....	78.00	.....	73.95	73.55	75.91	75.13	69.23
Of mastoid breadth .....	64.80	62.55	62.50	57.69	56.02	58.20	56.92
Of fronto-palatal depth .....	46.80	46.53	46.60	40.86	42.93	42.59	42.56
Of occipital depth .....	32.00	32.46	34.41	31.25	31.91	31.74	31.28
Of nasal bones .....	42.00	39.39	41.60	37.98	41.36	39.41	38.46
Of maxillary molar series (crowns) .....	20.00	18.61	20.41	21.92	20.94	21.21	18.97
Foramen magnum: ratio of height to width .....	76.92	82.05	87.56	115.38	107.40	111.53	119.34
Basi-occipital: ratio of length to breadth .....	105.45	103.57	103.77	126.82	122.50	117.07	119.23